

12. Combination as in manner of previous claims of said four antenna arms with said pyramidal conducting shield in the interior wherein the entire structure behaves as a log-periodic antenna.

13. The said combination wherein a short wire is attached to the narrow end of each said antenna arm, at an endpoint of the said antenna arm centerline, and threaded into the said square pyramidal conductor through said truncated tip of the said square pyramidal conductor.

Abstract: A non-planar log-periodic antenna feed with low ohmic loss, intermediate gain multioctave bandwidth, and dual polarization can be integrated with a low-noise MMIC amplifier, at ambient or cryogenic temperatures. Long, lossy transmission lines with nearly 1 dB loss, normally required for connecting log-periodic antennas to microwave signal detection circuits, are unnecessary in this design. Amplifiers are positioned close to the antenna terminals at the vertex of the antenna, inside a square pyramidal shield with half the opening angle of the antenna arms. The non-obvious idea is that a conductor enclosing a large volume of self-similar shape between the antenna arms enhances gain while preserving the frequency-independence of the log-periodic antenna over its operating bandwidth. The design has been reduced to practice. A 1 - 10 GHz prototype has been range tested. A small microwave telescope which incorporates this feed can achieve over multioctave bandwidths an A/T (sensitivity) that is unprecedented. Simple construction and low cost of manufacture make it ideal for use in telescope arrays.